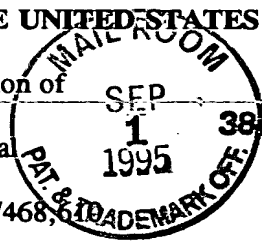


1808
14 m
1802

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In re Patent Application of

Simon C. Burton, et al

Application No.: 08/468,610

Filed: June 6, 1995

For: CHROMATOGRAPHIC RESINS
AND METHODS FOR USING
SAME

Group Art Unit: 1804

Examiner: Unassigned

1808 ✓
18C 10/5

INFORMATION DISCLOSURE STATEMENT
TRANSMITTAL LETTER

OCT 10 1995
GROUP 1800

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Enclosed is an Information Disclosure Statement and accompanying form PTO-1449 for
the above-identified patent application.

- ☒ [X] No additional fee for submission of an IDS is required.
- ☐ [] Charge \$_____ to Deposit Account No. 02-4800 for the fee due.
- ☐ [] A check in the amount of \$_____ is enclosed for the fee due.

The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R.
§§ 1.16, 1.17 and 1.21 that may be required by this paper, and to credit any overpayment, to
Deposit Account No. 02-4800. This paper is submitted in triplicate.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS

By: Gerald F. Swiss
Gerald F. Swiss
Registration No. 30,113

P.O. Box 1404
Alexandria, Virginia 22313-1404
(415) 854-7400

Date: August 23, 1995

Attorney's Docket No. 010055-134

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Simon C. Burton, et al.

Application No.: 08/468,610

Filed: June 6, 1995

For: **CHROMATOGRAPHIC RESINS
AND METHODS FOR USING
SAME**



Group Art Unit: 1804

Examiner: Unassigned

RECEIVED
OCT 10 1995
GROUP 1800

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In accordance with the duty of disclosure as set forth in 37 C.F.R. §1.56, Applicants hereby submit the following information in conformance with 37 C.F.R. §§ 1.97 and 1.98. Pursuant to 37 C.F.R. § 1.98(d), copies of the documents cited are not enclosed insofar as these documents were all cited in the parent application, Serial No. 08/268,178. The Examiner is requested pursuant to 37 C.F.R. §1.98(d) to obtain copies of these references from this parent application and to place them into the file for this application.

U.S. Patent 3,917,527, Shaltiel, issued November 4, 1975.

U.S. Patent 3,956,179, Sebastian, et al., May 11, 1976.

U.S. Patent 3,960,720, Porath, et al., June 1, 1976.

U.S. Patent 4,048,416, Axen, et al., September 13, 1977.

U.S. Patent 4,693,985, Deger, et al., September 15, 1987

U.S. Patent 4,886,755, Ngo, issued December 12, 1989.

European Patent Application 0 180 563 (inadvertently cited as 1 180 564 in parent case).

International Publication Number WO 94/04192, Lindgren, et al., Published March 3, 1994.

Swedish Patent Application 488,814 (Chem abstract No. 119:97004 Only)

Asenjo, J.A. et al., "Rational Design of Purification Processes for Recombinant Proteins", *Ann. N.Y. Acad. Sci.*, **646**:334-356 (1991).

Bischoff, R. et al., "Chemically Synthesized Hydrophobic Anion-Exchange High-Performance Liquid Chromatography Supports Used For Oligonucleotide Resolution By Mixed Mode Chromatography", *Journal of Chromatography*, 9667-9673 (1983).

Bischoff, R. et al, "Isolation of Specific tRNAs Using an Inoic-Hydrophobic Mixed-Mode Chromatographic Matrix", *Analytical Biochemistry*, **151**:526-533 (1985).

Bischoff, R. et al., "Mixed-Mode Chromatographic Matrices For the Resolution of Transfer Ribonucleic Acids", *Journal of Chromatography*, **317**:251-261 (1984).

Bischoff, R., et al., "Nucleic Acid Resolution By Mixed-Mode Chromatography", *Journal of Chromatography*, (1984).

Burton, C., et al., "Efficient Substitution of 1,1'-carbonyldiimidazole Activated Cellulose and Sepharose Matrices With Amino Acyl Spacer Arms", *Journal of Chromatography*, **587**:271-275 (1991).

Butler, L.G., "Enzyme Immobilization by Adsorption on Hydrophobic Derivatives of Cellulose and Other Hydrophilic Materials", *Arch. Biochem. Biophys.*, **171**:645-650 (1975).

Caldwell, K.D. et al., "Utilization of Hydrophobic Interaction for the Formation of an Enzyme Reactor Bed", *Biotechnol. Bioeng.*, **17**:613-616 (1975).

Cashion, P. et al., "Enzyme Immobilization on Tritylagarose", *Biotech. Bioeng.*, **24**:403-423 (1982).

Champluvier, B. et al., "Dye-Ligand Membranes as Selective Adsorbents for Rapid Purification of Enzymes: A Case Study", *Biotechnol. Bioeng.*, **40**:33-40 (1992).

Crowther et al., "High-Performance Liquid Chromatographic Separation of Oligonucleotides And Other Nucleic Acid Constituents On Multifunctional Stationary Phases", *Journal of Chromatography*, **282**:619-628 (1983).

Floyd et al., "Use of Diluted Anion-Exchange and Hydrophobic Properties in Separating Synthetic Single-Stranded Oligodeoxyribonucleotides on Mixed-Ligand Stationary Phases", *Chromatographia*, **21**:402-408 (1986).

Heath, C.A. et al., "Synthetic Membranes in Biotechnology: Realities and Possibilities", *Adv. Biochem. Eng./Biotechnol.*, **47**:45-88 (1992).

Heinitz et al., "Chromatography Of Proteins On Hydrophobic Interaction And Ion-Exchange Chromatographic Matrices: Mobile Phase Contributions To Selectivity", *Journal of Chromatography*, **443**:173-182 (1988).

Hoffman et al., "Ion Exchange in Reversed-Phase Chromatography Of Some Simple Organic Cations", *Journal of Chromatographic Science*, **28**:428-431 (1990).

Hoftsee, B.H.J., "Protein Binding by Agarose Carrying Hydrophobic Groups in Conjunction with Charges", *Biochem. Biophys. Res. Commun.*, **50**:751-757 (1973).

Hoftsee, B.H.J., "Hydrophobic Affinity Chromatography of Proteins", *Anal. Biochem.*, **52**:430-448 (1973).

Hutchinson, D.W., "The Preparation and Properties of Immobilised Dipeptidyl-aminopeptidase I (cathepsin C)", *Biochem. Biophys. Acta*, **916**:1-4 (1987).

Johansson, G. et al., "Affinity Partition Between Aqueous Phases - A Tool for Large-Scale Purification of Enzymes", *J. Biotechnol.*, **11**:135-142 (1989).

Jost, R. et al., "The Mode of Adsorption of Proteins to Aliphatic and Aromatic Amines Coupled to Cyanogen Bromide-Activate Agarose", *Biochem. Biophys.*, **362**:75-82 (1974).

Kasche V., et al., "Rapid Protein Purification Using Phenylbutylamine-Eupergit: a novel method for large-scale procedures", *J. Chromatography*, **510**: 149-154 (1990).

Lloyd et al., "Mixed-Mode Column Thermospray Liquid Chromatography/Mass Spectrometry", *Anal. Chem.*, **59**:2533-2534.

Luong, J.H.T. et al., "Synthesis and Characterization of a Water-Soluble Affinity Polymer for Trypsin Purification", *Biotechnol. Bioeng.*, **31**:439-446 (1988).

Maisano et al., "Synthesis Of New Hydrophobic Adsorbents Based on Homonologues Series of Uncharged Alkyl Sulphide Agarose Derivatives", *J. Chromatography*, **321**:305-317 (1985).

McLaughlin, W., "Mixed-Mode Chromatography of Nucleic Acids", *Chem. Rev.*, **89**:309-319 (1989).

Nau, "Effects of Mobile Phase Conditions on Protein Conformation and Chromatographic Selectivity in Ion Exchange and Hydrophobic Interaction Chromatography", *BioChromatography*, **4**:62-68 (1989).

Ngo, et al., "Chemistry and Preparation of Affinity Ligands Useful in Immunoglobulin Isolation and Serum Protein Separation", *Journal of Chromatography*, **510**:281-291 (1990).

Ochoa, J.L., "Hydrophobic (Interaction) Chromatography", *Biochimie*, **60**:1-15 (1978).

Ortin, A. et al., "Large Scale Extraction of a α -Lactalbumin and β -Lactoglobulin from Bovine Whey by Precipitation with Polyethylene Glycol and Partitioning in Aqueous Two-Phase Systems", *Prep. Biochem.*, **22**:53-66 (1992).

Oscarsson, S. et al., "Covalent Chromatography and Salt-Promoted Thiophilic Adsorption", *Anal. Biochem.*, **176**:330-337 (1989).

Porath, J. et al., "A New Kind of 'Thiophilic' Electron-Donor-Acceptor Adsorbent", *Makromol. Chem., Macromol. Symp.*, **17**:359-371 (1988).

Simmonds et al., "Protein Chromatography on Adsorbents with Hydrophobic and Ionic Groups", *Biochem. J.*, **157**:153-159 (1976).

Rosengren et al., "Hydrophobic Interaction Chromatography Non-Charged Sepharose Derivatives", *Biochimica et Biophysica Acta.*, **412**:51-86 (1975).

Ruaan, R.C. et al., "Dual-Functional Affinity Protein Purification", *Biotechnol. Prog.*, **4**:107-112 (1988).

Sasaki I. et al., "Hydrophobic-Ionic Chromatography", *J. Biochem.*, **86**:1537-1548 (1979).

Sasaki I. et al., "Hydrophobic-Ionic Chromatography: Its Application to Microbial and Glucose Oxidase, Hyaluronidase, Cholesterol Oxidase, and Cholesterol Esterase", *J. Biochem.*, **91**:1555-1561 (1982).

Simons, P. C. et al., "Purification of Glutathione S-Transferases from Human Liver by Glutathione-Affinity Chromatography", *Anal. Biochem.*, **82**:334-341 (1977).

Teichberg, V.I., "Affinity-Repulsion Chromatography", *J. Chromatogr.*, **510**:49-57 (1990).

Voutsinas, P.L. et al., "Coagulation of Skim Milk with Proteases Immobilized on Hydrophobic Carriers", *Dairy Sci.*, **66**:694-703 (1983).

Yon, R.J., et al., "Protein Chromatography on Adsorbents with Hydrophobic and Ionic Groups", *Biochem J.*, **151**:281-290 (1975).

Yon R. J., "Chromatography of Lipophilic Proteins on Adsorbents Containing Mixed Hydrophobic and Ionic Groups", *Biochem J.*, **126**:765-767 (1972).

Zhu et al., "Mixed-mode Hydrophilic and Ionic Interaction Chromatography Rivals Reversed Phase Liquid Chromatography for the Separation of Peptides", *Journal of Chromatography*, **594**:75-86 (1992).

To assist the Examiner, the above-noted documents are listed on the attached form PTO-1449. It is respectfully requested that an Examiner-initialled copy of this form be returned to the undersigned.

Insofar as this Information Disclosure Statement is filed prior to Applicants receipt of a first Office Action on the merits, there is no fee due with the filing of this Statement. In the event this Information Disclosure Statement is received after the mailing of a first

Office Action on the merits, the Commissioner is hereby authorized to charge the \$210.00 fee due under 37 C.F.R. § 1.17(p) to deposit account 02-4800. This paper is submitted in triplicate.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS

By: Gerald F. Swiss
Gerald F. Swiss
Registration No. 30,113

P.O. Box 1404
Alexandria, VA 22313-1404
Phone: (415) 854-7400

Date: August 31, 1995